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THE COMMON BARBERRY AND HOW TO KILL IT

F. E. KEMPTON

Associate Pathologist in Charge of the Barberrry-Eradication Campaign
and

NOEL F. THOMPSON

Associate Pathologist, Office of Cereal Investigations, Bureau of Plant Industry

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The common barberry is largely responsible for the spread of black stem rust of small grains. It is estimated that in 1916 stem rust destroyed over 180,000,000 bushels of spring wheat alone, enough to have made eleven billion 1-pound loaves of bread. Thousands of acres were so badly damaged that they were never harvested. In some localities the growing of small grain has been abandoned because of repeated destructive epidemics of stem rust. According to estimates of the Plant-Disease Survey of the United States Department of Agriculture, the average annual loss in the United States due to stem rust in eight years, 1916 to 1923, inclusive, was about 50,000,000 bushels of small grains.

The campaign for the eradication of the common barberry was begun in 1918 by the United States Department of Agriculture, in cooperation with 13 grain-growing States of the upper Mississippi Valley, as follows: Colorado, Illinois, Indiana, Iowa,

Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming. Millions of common barberry bushes have been destroyed. In the more eastern of these States, where widespread epidemics are not of yearly occurrence, the removal of the offending barberries has reduced the losses from stem rust to a minimum. It now appears that complete eradication of all rust-susceptible barberries from the upper Mississippi Valley will very materially reduce the losses resulting from stem rust.

BLACK STEM RUST AND THE COMMON BARBERRY

Black stem rust is a very tiny plant which is recognized by grain growers as small black spots on the sheaths and stems of badly rusted grain. It also appears as orange-yellow spots filled with many small spores on the leaves of the common barberry. By means of these small

dustlike spores (or seeds) it spreads from the barberry leaf to the stems, leaves, and leaf sheaths of small grains and some grasses. On these it grows, causing severe damage.

The brief life story of black stem rust is as follows: It starts on the common barberry in the spring from black or winter spores which have lived over the winter on stubble or grass. It attacks the leaves, young shoots, and even the fruits of the common barberry. This is the spring or cluster-cup stage, producing yellowish spores. These spores spread rust from the barberry to grains and grasses but can not spread rust from one barberry bush to another. The red rust, or summer stage, then de-

The red spores, which can start rust on grain, rarely survive northern winters, but the black spores live over the winter in abundance. In the spring they germinate and produce tiny colorless spores, which germinate on the barberry, and the whole process is repeated. It is evident, therefore, that the black spores can not spread stem rust to grains and grasses and are therefore harmless unless there are barberry bushes near by.

HOW TO IDENTIFY THE COMMON BARBERRY

The common barberry (*Berberis vulgaris* L.) has been used as an ornamental shrub as a single bush or in



FIG. 1.—A common barberry bush. Destroy this kind. It may be done by applying salt. Ten pounds will kill an average-sized bush. This size takes more

velops on the stems and leaves of these grains and grasses as reddish brown spots. Each spot contains hundreds of very tiny reddish or summer spores of the black rust. Many farmers believe this red rust is harmless, but it is one stage of the terrible black rust. These spores can not infect the barberry, but they spread the rust to other grain and grass plants. As long as conditions are favorable a new crop of red spores may develop every week or 10 days in hot, muggy weather. Later in the season, when the heads begin to fill, great numbers of black or winter spores form in these same spots. This is the dreaded black rust.

clumps or hedges. In earlier days the leaves were used for medicinal teas, the roots for dye material, and the berries for jelly. Its seeds have been spread by birds, animals, wind, and water to woodlands, brushy pastures, rocky cliffs, stream banks, and fence rows until millions of escaped bushes have sprung up in localities where this bush has been planted. This shrub (fig. 1) is tall and erect, usually 5 to 7 feet high but often attaining a height of 12 feet or more. As a rule, many stalks arise from a single crown. The bark is grayish, and there are spines along the stem, usually in groups of three or more. There are green and purple varieties of common

barberries. The leaves normally are produced in clusters and always have bristle-toothed edges. The small yellow flowers are inconspicuous, but the oblong red berries, which are produced in late summer and fall, are numerous and easily seen. They hang in drooping clusters, like currants. The wood of both shoots and roots is of a bright-yellow color. Look over your property carefully. You may have common barberries. These bushes are sometimes sold under other names.

The Japanese barberry (*Berberis thunbergii* DC.; fig. 2) is harmless, and therefore should not be destroyed. It is a low, gracefully spreading shrub, seldom more than 4 or 5 feet tall, and has been widely used as a decorative hedge plant. The bark is reddish, and the small spines usually are single, but sometimes in threes, especially on older parts of the plant. The edges of the leaves are smooth, and the flowers and berries occur either singly or in very small bunches of two or three like gooseberries. Hybrid barberries having characteristics of both the common barberry and the Japanese bar-

North Carolina. It has been reported from Georgia and Missouri. A few patches of it have been found in Indiana and Illinois. It causes destructive local epidemics of stem rust and should be destroyed.

HOW TO KILL THE COMMON BARBERRY

The common barberry is very difficult to kill by digging or pulling, but is readily killed by certain chemicals.



FIG. 3.—Sprouts like these appear where barberry bushes are not carefully dug or treated



FIG. 2.—Japanese barberry bush. Keep this kind

berry are known to carry rust and should be destroyed.

There are several native and introduced species of barberries. Some of these rust; others do not. Those that rust should be destroyed. A native species (*Berberis canadensis* Miller) is common in the Allegheny Mountains of southwestern Virginia, southeastern West Virginia, and western

In digging, fragments of roots frequently are left in the ground, and sprouts may develop from these (fig. 3). Bushes near valuable trees or shrubs should be dug or pulled. The use of chemicals is strongly recommended wherever valuable plants will not be endangered and where slight sterilization of the soil for a few years will not be objectionable. Of the various chemicals tested, salt and kerosene have proved the most satisfactory. The plants may be cut down before treatment or they may be left standing. Standing bushes make it easier to find the location and determine whether sprouts or seedlings have developed.

DIRECTIONS FOR THE USE OF SALT AND KEROSENE

SALT

For barberries having a group of shoots about 12 inches in diameter at the base, use 10 pounds of dry salt. For plants about 6 inches in diameter, use 5 pounds. For small plants having only one or two shoots, use 2 pounds. For large clumps, estimate the area at the surface of the ground plus a border 6 inches in

width and use 2 pounds of salt for each square foot of this area (fig. 1).

Pile the salt in and about the base of the plant so as to surround all shoots. Be very careful that no shoots are missed, especially those growing a little way from the main clump. With large clumps, be sure that the distribution of the salt is uniform and that no outlying shoots are missed. Crushed rock salt, commonly called ice-cream salt, is preferable, although ordinary flake or packer's salt, commonly used on farms, is satisfactory.

Salt treatment is effective at any time of the year when the ground is not frozen. If there is danger of the salt being disturbed by livestock or otherwise, it may be covered by dirt, stones, brush, or pieces of boards. Do not allow farm animals to have access to the salt unless they previously have been given enough so that they are not hungry for it.

KEROSENE

For barberries having a group of shoots about 12 inches in diameter at the base, use 1 gallon of kerosene. For plants 6 inches in diameter, use 2 quarts. For small plants having only one or two shoots, use 1 pint. For large clumps, estimate the area at the surface of the ground plus a border 6 inches in width and use 1 quart of kerosene for each square foot of this area.

Apply the kerosene to the base of the plant so that it wets the base of every shoot and also the ground for 3 or 4 inches around every shoot. Use care not to miss shoots growing a short distance from the main clump. With large clumps, be sure that the distribution of the chemical is uniform, and especially that outlying shoots are not missed.

Kerosene treatment is successful if applied at any time during the growing season, but the action of the kerosene is slow, and immediate results should not be expected. Poultry and livestock may be safely allowed to have free access to treated bushes.

PRECAUTIONS

Other plants are as readily killed by salt or kerosene as barberries. Unless care is used, valuable shrubs or trees also may be killed. In practice it has been found that escaped barberries growing in woodlands in the north-central part of the United States may be treated with little danger to large trees. Persons are warned, however, against chemical treatment of barberries growing near valuable planted shrubbery or trees.

Either salt or kerosene applied to soil in as large quantities as are here recommended will kill all surface vegetation in the area to which the chemical actually is applied. On fairly level land the area sterilized by the treatment will not be larger than that previously occupied by the clump of barberry bushes.

Kerosene in small quantities, obtainable from treated bushes, is not harmful to farm animals, and they may be safely allowed free access to barberries thus treated. Salt, on the other hand, while a necessary part of the diet of all animals, is harmful if a large quantity is eaten at one time. Young poultry are especially liable to injury, but even cattle may eat too much if they are salt hungry. It is generally agreed that farm animals should have free access to salt at all times, and where they do there can be no danger in allowing them access to barberries treated with salt. However, cattle are likely to scatter the salt applied to barberry bushes to such an extent that the treatment may be ineffective. It is always a good plan, therefore, to cover the salt with stones, sod, brush, or pieces of boards, so that it will not be disturbed.

If you find common barberries on your property or on that of a neighbor, or if you see barberry bushes or even a small plant or seedling while on automobile or other trips, please report the exact location with name and address of property owner either to your State agricultural college or to the Office of Cereal Investigations, Bureau of Plant Industry, United States Department of Agriculture, Washington, D. C.

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